

**REMARKS / ARGUMENTS****I. General Remarks and Disposition of the Claims**

Please consider the application in view of the following remarks. Applicants thank the Examiner for his careful consideration of this application, including the references that Applicants have submitted in this application and, pursuant to Manual of Patent Examining Procedure (MPEP) § 609.02, all references submitted in the applications to which this application claims priority under 35 U.S.C. § 120.

At the time of the Final Office Action, claims 77-79, 81-87, 107-112, 187, 188, 190-196, and 198-220 were pending in this application. Claims 77-79, 81-87, 107-112, 187, 188, 190-196, and 198-220 were rejected in the Office Action. By this paper, claims 77 and 206 have been amended. No new matter has been added to the application in view of the claim amendments. All the amendments are made in a good faith effort to advance the prosecution on the merits of this case. It should not be assumed that the amendments made herein were made for reasons related to patentability. Applicants respectfully request that the above amendments be entered and further request reconsideration in light of the amendments and remarks contained herein.

**II. Remarks Regarding Amendments to the Specification**

In this response Applicants have amended the specification to update the Cross-Reference to Related Application section. Specifically, Applicants have updated this section to note that the related applications have published. Applicants respectfully submit that this amendment enters no new matter into the specification.

**III. Remarks Regarding Rejection of Claims Under 35 U.S.C. § 112**

Claims 77-79, 81-87, 107-112, 187, 188, 190-196, 198-203, 204, and 205 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. With respect to this rejection, the Final Office Action states:

Applicant has amended independent claims 77 and 187 to further contain a new limitation regarding the hydrophobically-modified water soluble polymer formed from “a polymerization reaction comprising a hydrophilic monomer and a hydrophobically-modified hydrophilic monomer.” There is insufficient written description support for this limitation in the claims.

(Final Office Action at 3.) Applicants respectfully disagree and assert that the specification as originally written provides sufficient support for a hydrophobically-modified water soluble polymer formed from a polymerization reaction comprising a hydrophilic monomer and a hydrophobically-modified hydrophilic monomer. Applicants note that the instant application is a continuation-in-part of U.S. Patent Application Serial No. 10/440,337 (published as U.S. Patent Application Publication No. 2004/0229756) and incorporates U.S. Patent Application Publication No. 2004/0229756 by reference. Furthermore, Applicants note that U.S. Patent Application Publication No. 2004/0229756 states:

Additional polymers useful in this embodiment of the current invention are preferably prepared from a variety of hydrophilic monomers and hydrophobically modified hydrophilic monomers. Examples of particularly suitable hydrophilic monomers which can be utilized include, but are not limited to, acrylamide, 2-acrylamido-2-methyl propane sulfonic acid, N,N-dimethylacrylamide, vinyl pyrrolidone, dimethylaminoethyl methacrylate, acrylic acid, dimethylaminopropylmethacrylamide, vinyl amine, vinyl acetate, trimethylammoniummethyl methacrylate chloride, methacrylamide and hydroxyethyl acrylate. Of these, acrylamide, 2-acrylamido-2-methyl propane sulfonic acid, acrylic acid, dimethylaminoethyl methacrylate, dimethylaminopropyl methacrylamide and vinyl pyrrolidone are preferred.

A variety of hydrophobically modified hydrophilic monomers can also be utilized to form the polymers useful in accordance with this invention. Particularly suitable hydrophobically modified hydrophilic monomers include, but are not limited to, alkyl acrylates, alkyl methacrylates, alkyl acrylamides and alkyl methacrylamides wherein the alkyl radicals have from about 4 to about 22 carbon atoms, alkyl dimethylammoniummethyl methacrylate bromide, alkyl dimethylammoniummethyl methacrylate chloride and alkyl dimethylammoniummethyl methacrylate iodide wherein the alkyl radicals have from about 4 to about 22 carbon atoms and alkyl dimethylammoniumpropyl methacrylamide bromide, alkyl dimethylammonium propylmethacrylamide chloride and alkyl dimethylammoniumpropyl methacrylamide iodide wherein the alkyl groups have from about 4 to about 22 carbon atoms. Of these, octadecyldimethylammoniummethyl methacrylate bromide, hexadecyldimethylammoniummethyl methacrylate bromide, hexadecyldimethylammoniumpropyl methacrylamide bromide, 2-ethylhexyl methacrylate and hexadecyl methacrylamide are preferred.

Polymers that are useful in accordance with the present invention can be prepared by polymerizing any one or more of the hydrophilic monomers with any one or more of the hydrophobically modified hydrophilic monomers. Methods for preparing such polymers are known to those skilled in the art as represented by U.S. Pat. No. 6,476,169 incorporated herein by reference.

See U.S. Patent Application Publication No. 2004/0229756 at ¶¶ [0026]-[0028]. Thus because U.S. Patent Application Publication No. 2004/0229756 has sufficient written description support for this limitation in the claim, and because the instant application incorporates U.S. Patent Application Publication No. 2004/0229756 by reference, Applicants submit that the instant application has sufficient written description support for this limitation in the claims. Therefore, Applicants respectfully request the withdrawal of this rejection.

#### **IV. Remarks Regarding Rejections Under 35 U.S.C. § 102**

##### **A. Claims 77-86, 88, 107-112, 187-195, 197-203, 206-213, and 215-222**

Claims 77-86, 88, 107-112, 187-195, 197-203, 206-213, and 215-222 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,532,052 issued to Weaver *et al.* (hereinafter "*Weaver*"). With respect to this rejection, the Final Office Action states:

The 35 U.S.C. 102(b) rejection of claims 206-213 and 215-220 as anticipated by United States Patent Number (USPN) 4,532,052 to Weaver *et al.* (hereinafter 'Weaver') . . . [have] been maintained for reasons previously made of record in item 8 on page 4 of OA.

The 35 U.S.C. 102(b) rejections of claims 77-86, 88, 107-112, 187-195 and 197-203 as anticipated by Weaver that was previously made of record in item 1 on page 2 of the Final Office Action mailed August 8, 2007 (hereinafter 'FOA') has been reinstituted due to the removal of new matter from the claims as discussed above in paragraph #1 of the instant action and in accordance with item 9 on page 8 of OA.

Applicant's arguments presented in Response regarding the captioned 35 U.S.C. 102 rejection as anticipated by Weaver have been fully considered but deemed unpersuasive.

Applicant's arguments concerning Weaver disclosing water-soluble polymers having branches that are hydrophobic in nature "increase water permeability" of a subterranean formation, whereas the "hydrophobically-modified water-soluble polymers"

of the instant claims "reduce the permeability" of the formation, are not persuasive. Particularly, Applicant's reliance on the Table on columns 9 and 10 as patentably distinguishing the present claims from Weaver due to this table allegedly showing hydrophobically-branched polymers increasing water permeability in a formation is misguided.

Examiner respectfully draws Applicant's attention to col. 7, lines 26-30 and col. 9, lines 49-63 in Weaver disclosing the following:

"Of course, for applications altering aqueous fluid properties, such as altering fluid loss of a treatment or drilling fluids, the penetration of aqueous fluid and branched polymer should be a minimum or only a fraction of an inch. The polymer is preferably a branched organic polymer having a molecular weight of about 900-50,000,000 with a backbone chain having reactive sites on which a branch chain can be or has been attached with branched chains being attached to the backbone chain in a concentration of about 0.1-99% of said reactive sites. The branched organic polymer also contains a hydrophilic portion in a concentration sufficient *to produce the desired hydrophilic-hydrophobic balance* within the formation and to alter the hydrophilic characteristics in the formation ... .Thus, broadly speaking, one preferred application of this invention comprises one or more processes and polymer compositions for altering the surface characteristics of and/or fluid flow characteristics or a substrate or a formation which includes contacting said formation with a *highly branched organic polymer* which has an attaching portion and a modifying portion. The attaching portion of said polymer generally has ionic groups which establish the desired ionic bond or repulsion in the formation. *The modifying portion of said polymer has the hydrophilic-hydrophobic balance desired to produce the desired formation surface characteristics and/or interaction with fluids such as gelling and increasing or decreasing permeability to certain fluids.*"

That is, Weaver is teaching that fluid loss altering properties of the disclosed modified water-soluble polymers *are dependent on the hydrophilic/hydrophobic balance* of the modifying branches of the highly-branched water-soluble polymers. The table in col. 9-10 is showing that if said hydrophilic/hydrophobic *balance* of the modifying branches is hydrophobic, the resulting polymer would increase water permeability, whereas if the branches of the water-soluble polymer are, *in balance*, hydrophilic, it would decrease water permeability (if the polymer attaching unit is either anionic or cationic but not "nonionic").

Present independent claims 77 and 187 recite the water-soluble polymer to be “hydrophobically-modified” and “formed from a reaction comprising a hydrophilic polymer and a hydrophobic polymer”. Accordingly, providing the terms in these claims their broadest possible interpretation, the present claims would read on a water-soluble highly branched cationic polymer having a hydrophilic backbone (e.g. chitosan) with numerous hydrophilic branches that has been modified by a hydrophobic compound (e.g., alkyl halide). The resultant polymer would be a “water-soluble hydrophobically modified polymer” containing a cationic hydrophilic backbone, numerous hydrophilic branches and a hydrophobic alkyl branch, thereby having a hydrophilic/hydrophobic balance that is *hydrophilic* in nature. Consequently, because this highly-branched, cationic polymer would be a “hydrophobically-modified water-soluble polymer” in accordance with the instant claims, but yet has a *hydrophilic* balance in terms of its hydrophilic-hydrophobic branch ratio, it would *decrease water permeability* in accordance with Weaver’s teachings in the chart depicted on columns 9 and 10.

Thus, the claims, as amended, are anticipated by Weaver.

(Final Office Action at 2-6.) Applicants respectfully submit that the cited reference does not disclose each and every limitation of claims 77-79, 81-87, 107-112, 187, 188, 190-196, 198-203, 204, and 205 as required to anticipate these claims under 35 U.S.C. § 102(b). *See* MPEP § 2131.

In particular, with respect to independent claims 77, 187, and 206, *Weaver* fails to disclose a hydrophobically modified water-soluble polymer that “reduces the permeability of the subterranean formation to an aqueous-based fluid.” The Examiner is apparently alleging that *Weaver* discloses polymers, comprising a hydrophilic polymer backbone with numerous hydrophilic branches and a hydrophobic alkyl branch, may be used to reduce the permeability of a subterranean formation to an aqueous-based fluid. (*See* Final Office Action at 5-6.) The Examiner is alleging that these polymers would be a hydrophobically-modified water-soluble polymer in accordance with the instant claims. (*See* Final Office Action at 6.) Applicants respectfully disagree because the Examiner has not demonstrated that *Weaver* discloses polymers, comprising a hydrophilic polymer backbone with numerous hydrophilic branches and a hydrophobic alkyl branch, that reduce the permeability of a subterranean formation to an aqueous-based fluid.

Applicants believe that the Examiner is assuming that *Weaver* discloses such a polymer because *Weaver* references polymers with a “hydrophilic-hydrophobic balance” that

may be used to increase or decrease the permeability of a subterranean formation to an aqueous-based fluid. *See Weaver*, col. 9, lines 59. However, Applicants note that while *Weaver* may refer to a hydrophilic-hydrophobic balance, *Weaver* only references this balance when discussing that “the branched organic polymer also contains a hydrophilic portion in a concentration sufficient to produce the desired hydrophilic-hydrophobic balance within the formation” and that “the modifying portion of said polymer has the hydrophilic-hydrophobic balance desired to produce the desired formation surfaces characteristics and/or interaction with fluids such as gelling and increasing or decreasing permeability to certain fluids.” *See Weaver*, col. 7, lines 26-30; col. 9, lines 58-63. Although in some embodiments *Weaver* discloses that a branched organic polymer with a backbone on which a branch chain can be attached in addition to a hydrophilic portion which then may reduce the permeability of a subterranean formation an aqueous-based fluid, *Weaver* does not disclose that this branch chain is a hydrophobic branch comprising an alkyl chain of about 4 to about 22 carbons, as required by Applicants’ claims. *See Weaver*, entire disclosure. Nor does *Weaver* disclose a hydrophobically modified polymer that reduces the permeability of a subterranean formation to aqueous-based fluids. *See Weaver*, entire disclosure.

Furthermore, although *Weaver* may disclose polymers which have some hydrophobic portions, Applicants note *Weaver* teaches that branched polymers containing a hydrophobic modifying portion function to increase water permeability. *See Weaver*, col. 7, lines 43-52. *Weaver* states, “another class of polymers can be prepared which have some hydrophobic and/or oleophilic portions, branches or overall nature so that these polymers can . . . produce a surface effect . . . which . . . increases the permeability of the formation to aqueous fluids.” *See Weaver*, col. 7, lines 43-52. Thus, *Weaver* teaches that even the presence of even some hydrophobic branches (not just an overall balance) would cause an increase in the permeability of a subterranean formation to aqueous-based fluids. Applicants also direct the Examiner’s attention to the table contained in columns 9 and 10 of *Weaver*. *See Weaver*, col. 9-10. As set forth in this table, *Weaver* teaches that branched polymers including a hydrophobic modifying portion increase water permeability. *See id.* Nowhere in *Weaver* is a polymer comprising a hydrophobically modified water-soluble polymer formed from a reaction comprising a hydrophilic polymer and a hydrophobic compound or a polymerization reaction comprising a hydrophilic monomer and a hydrophobically modified hydrophilic monomer

disclosed that reduces the permeability of a subterranean formation to an aqueous-based fluid. *See Weaver*, entire disclosure. Applicants respectfully request that the Examiner explicitly point out where *Weaver* discloses such a polymer if the Examiner does not agree.

Therefore, Applicants respectfully assert that independent claims 77, 187, and 206 and their dependent claims are not anticipated by *Weaver*. Accordingly, Applicants respectfully request withdrawal of this rejection with respect to claims 77-86, 88, 107-112, 187-195, 197-203, 206-213, and 215-222.

**B. Claims 206-213 and 215-222**

Claims 206-213 and 215-222 stand rejected under 35 U.S.C. § 102(b) as being rejected by U.S. Patent No. 3,271,307 issued to Dickson *et al.* (hereinafter "*Dickson*"). With respect to this rejection, the Final Office Action states:

The 35 U.S.C. 102(b) rejection of claims 206-213 and 215-220 as anticipated by . . . USPN 3,271,307 to Dickson *et al.* (hereinafter '*Dickson*') ha[ve] been maintained for reasons previously made of record in item 8 on page 4 of OA.

(Final Office Action at 2.) Applicants respectfully disagree.

Applicants respectfully note that item 8 on page 4 of OA fails to address the *Dickson* reference. (*See* Office Action mailed April 3, 2008 at 4.) Rather, item 8 on page 4 of OA addresses the rejection of these claims under 102(b) by *Weaver*. (*See* Office Action mailed April 3, 2008 at 4.) Moreover, Applicants note that the Examiner has not provided any basis on how claims 206-213 and 215-220 are anticipated by *Dickson*. It is Applicants' belief that the Examiner has intended to state that only the rejections of claims 206-213 and 215-220 as anticipated by *Weaver* have been maintained. Therefore, as the Examiner has failed to provide any basis on how these claims are anticipated by *Dickson*, Applicants respectfully request the withdrawal of this rejection.

**V. Remarks Regarding Rejections Under 35 U.S.C. § 103(a)**

Claims 83, 86-88, 192, 195-197, and 210, 213, and 214 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Weaver* in view of U.S. Patent No. 6,358,889 issued to Waggenpack *et al.* (hereinafter "*Waggenpack*"). With respect to this rejection, the Final Office Action states:

The 35 U.S.C. 103(a) rejection of claims 210, 213 and 214 as unpatentable over *Weaver* in view of USPN 6,358,889 82 to

Waggenpack et al. (hereinafter 'Waggenpack') has been maintained for reasons previously made of record in item 9 on page 7 of OA. This rejection over claims 83, 86-88, 192 and 195-197 has been reinstituted due to Applicant's removal of new matter in Response as discussed *supra* in the instant action.

Applicant's arguments presented in Response regarding the captioned 35 U.S.C. 103 rejection of claims 83, 86-88, 192 and 195-197 as unpatentable over Weaver in view of Waggenpack have been considered but deemed unpersuasive.

Applicant's sole argument in Response traversing this rejection is that Waggenpack does not cure the alleged "deficiencies" in Weaver. However, these arguments regarding the alleged deficiencies in Weaver were addressed above in the instant action and were found not persuasive.

Thus, the claims, as amended, are unpatentable over Weaver and Waggenpack.

(Final Office Action at 2-3, 6.) Applicants respectfully disagree.

In order for a reference or combination of references to form the basis for a rejection under § 103(a), the reference or combination of references must teach or suggest all of the elements of the claim. As discussed above in Section IV(A), *Weaver* fails to teach each and every limitation of independent claims 77, 187, and 206. Specifically, *Weaver* fails to teach "a relative permeability modifier comprising a hydrophobically modified water-soluble polymer formed from a reaction comprising a hydrophilic polymer and a hydrophobic compound or a polymerization reaction comprising a hydrophilic monomer and a hydrophobically modified hydrophilic monomer . . . wherein the hydrophobically modified water-soluble polymer reduces the permeability of [ ]the subterranean formation to an aqueous-based fluid." Moreover, *Waggenpack* fails to obviate the deficiencies of *Weaver*. Rather, the Examiner is merely relying on *Waggenpack* for its alleged teaching of a modified chitosan copolymer. (See Office Action mailed April 3, 2008.) Claims 83, 86-88, 192, 195-197, and 210, 213, and 214 depend, either directly or indirectly, from claims 77, 187, and 206 and therefore include all the limitations of their independent claim. Thus, claims 83, 86-88, 192, 195-197, and 210, 213, and 214 are patentable over the combination of *Weaver* and *Waggenpack*. See 35 U.S.C. § 112 ¶ 4 (2004). Accordingly, for at least these reasons, Applicants respectfully request withdrawal of this rejection with respect to claims 83, 86-88, 192, 195-197, and 210, 213, and 214.



**VI. No Waiver**

All of Applicants' arguments and amendments are without prejudice or disclaimer. Additionally, Applicants have merely discussed example distinctions from the cited references. Other distinctions may exist, and Applicants reserve the right to discuss these additional distinctions in a later Response or on Appeal, if appropriate. By not responding to additional statements made by the Examiner, Applicants do not acquiesce to the Examiner's additional statements, such as, for example, any statements relating to what would be obvious to a person of ordinary skill in the art.

**SUMMARY**

In light of the above amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections. Applicants further submit that the application is now in condition for allowance, and earnestly solicit timely notice of the same. Applicants respectfully request that the examiner issue an Advisory Action if the examiner does not find the claims to be allowable in light of the remarks made herein. Should the Examiner have any questions, comments or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile, or electronic mail.

Applicants believe that no fees are due in association with the filing of this Response. Should the Commissioner deem that any fees are due, including any fees for extensions of time, the Commissioner is authorized to debit Baker Botts L.L.P. Deposit Account No. 02-0383, Order No. 063718.0321, for any underpayment of fees that may be due in association with this filing.

Respectfully submitted,

A handwritten signature in black ink that reads "Larissa Piccardo". The signature is written in a cursive style with a large, looped initial "L".

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